

Non-Haemorrhagic Immediate Puerperal Complications and their Association with Maternal Risk Factors

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Abstract

Background: Haemorrhage dominates discussion of early puerperal morbidity, but other complications arising in the first 24 hours after delivery also contribute to maternal illness. Their distribution across maternal risk factors in Bangladeshi tertiary hospitals is poorly documented. This study aimed to describe the types of non-haemorrhagic immediate puerperal complications and their distribution according to maternal risk factors. **Methods:** A hospital-based cross-sectional study with prospective data collection was carried out at Dhaka Medical College Hospital from July to December 2009. Three hundred women aged 15 to 45 years, selected randomly from those admitted for delivery, were observed for 24 hours after birth. Women with teenage pregnancy, grand multiparity, severe anaemia, pre-eclampsia, eclampsia, antepartum haemorrhage, prolonged or obstructed labour or prolonged rupture of membranes formed the risk group. Data were analysed descriptively. **Results:** Twenty-three non-haemorrhagic complications (7.66%) were recorded, 22 (7.33%) in the risk group and 1 (0.33%) in the non-risk group. Tachycardia was the most frequent complication (16 events), followed by paralytic ileus (4) and urinary retention (3). Prolonged rupture of membranes accounted for 8 events, obstructed labour for 6, prolonged labour for 4, antepartum haemorrhage for 3 and severe anaemia for 1. No complication was reported with age below 18 years, grand multiparity or pre-eclampsia/eclampsia. Lower uterine caesarean section was performed in 58.00% of the risk group and 4.60% of the non-risk group. **Conclusion:** Non-haemorrhagic immediate puerperal complications were concentrated among women with identified risk factors, particularly prolonged rupture of membranes, obstructed labour and prolonged labour. Close observation of such women in the first 24 hours is warranted.

Keywords: Puerperal disorders; postpartum period; tachycardia; paralytic ileus; urinary retention; risk factors.

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INTRODUCTION

Maternal mortality has fallen globally, yet pregnancy and childbirth remain a leading cause of death among women and progress is slowest where health systems are least resourced [1]. Haemorrhage is the largest single direct cause of maternal death, but the combined contribution of hypertensive disorders, sepsis and other direct and indirect causes exceeds it [2]. Attention to the remaining burden therefore requires a closer look at complications that are not haemorrhagic. Understanding which complications arise in the first day and in which women, is central to targeting limited postnatal resources.

South Asia is home to about 22% of the world's population and around 188,000 women in the region die

each year from complications of pregnancy and childbirth [3]. Almost all of these deaths are considered preventable when a skilled attendant is present at birth and emergency referral is possible [4]. Maternal mortality in developing countries has long been described as a neglected tragedy and postpartum care has received less attention than antenatal care even though more than half of maternal deaths occur after delivery [5,6].

The puerperium is the period during which the anatomical and physiological changes of pregnancy are reversed and the body returns to the non-pregnant state [7,8]. The abnormal puerperium covers a wide range of disorders, including infection, disturbances of micturition and bowel function and other problems that

arise once the placenta has been delivered [9,10]. Complications of the third stage of labour and sudden postpartum collapse may also manifest within hours of birth [11,12]. Because the greatest risk lies in the first 24 hours, events in this interval deserve separate study.

Several non-haemorrhagic complications are linked to labour and its complications. Prolonged rupture of membranes predisposes to intrauterine and puerperal infection and a Cochrane review found that planned early birth reduced maternal infection compared with expectant management in term prelabour rupture of membranes [13]. Prophylactic strategies against puerperal fever have been a long-standing concern of obstetricians [14]. Urinary retention after delivery is common and a meta-analysis identified epidural analgesia, instrumental delivery, episiotomy and primiparity as risk factors for overt retention [15]. Obstetric factors also influence the post-void residual bladder volume and epidural analgesia has been shown to increase the risk of retention [16,17]. Tachycardia and paralytic ileus, though less often examined, may follow prolonged or obstructed labour, infection and anaemia.

Most hospital studies in this field have either focused on haemorrhage or grouped all puerperal complications together, which obscures the relation between individual complications and the maternal conditions that precede them. In a referral hospital such as a medical college hospital, women with teenage pregnancy, grand multiparity, severe anaemia, hypertensive disorders, antepartum haemorrhage, prolonged or obstructed labour and prolonged rupture of membranes are admitted in considerable numbers and the complications they develop in the immediate puerperium have not been well documented. Without such information, observation after delivery tends to be uniform rather than directed at the women most likely to deteriorate.

This study therefore aimed to describe the types of non-haemorrhagic immediate puerperal complications occurring within 24 hours of delivery among women admitted to a tertiary hospital in Bangladesh and to examine how these complications were distributed in relation to predefined maternal risk factors. The findings are intended to help clinicians identify women who need closer observation in the first day after birth.

MATERIALS AND METHODS

This hospital-based cross-sectional study, with prospective data collection, was conducted in the inpatient Department of Obstetrics and Gynaecology of Dhaka Medical College Hospital, a tertiary referral centre in Bangladesh, over six months from July to December 2009. From all women admitted to the labour ward for delivery, 300 were selected randomly. Women aged 15 to 45 years with a gestation of at least 37 weeks,

who delivered vaginally, by instrument or by caesarean section and who could have obstetric or medical complications such as pregnancy-induced hypertension, premature rupture of membranes, obstructed or prolonged labour, anaemia, jaundice or heart disease, were eligible; women with diabetes, intrauterine fetal death or multiple pregnancy were excluded. Women were assigned to the risk group when they had teenage pregnancy, grand multiparity, severe anaemia, pre-eclampsia, eclampsia, antepartum haemorrhage, prolonged labour, obstructed labour or prolonged rupture of membranes and the remaining women formed the non-risk group. A detailed history, with attention to earlier antenatal records and a thorough clinical examination were completed for every woman. Urine was tested for protein, haemoglobin was estimated by the haemoglobin paper method, blood grouping and Rh typing were done in all cases and pelvic ultrasonography was performed in some cases when available. Labour was monitored in all women, a partograph was kept for those planned for vaginal delivery, deviations from normal were managed at once and the third stage was managed actively. Each woman was observed closely for 24 hours after birth and maternal complications other than haemorrhage, namely tachycardia, paralytic ileus and urinary retention, were recorded against the woman's risk category and tabulated; neonatal complications were not studied. Applying one protocol to all participants kept the data consistent. The study was undertaken as a postgraduate thesis project in the department and confidentiality of patient information was maintained. Data were analysed descriptively: age, parity, anaemia grade, risk factors and mode of delivery were expressed as frequencies and percentages, complications were cross-tabulated by risk factor and by overall risk status and percentages for mode of delivery were calculated within each risk group. Because the results are descriptive, no inferential tests were applied and no significance level was set.

RESULTS

The study included 300 women admitted for confinement. Non-haemorrhagic immediate puerperal complications numbered 23 (7.66% of the sample), of which 22 (7.33%) occurred in women with identified risk factors and 1 (0.33%) in a woman without. Tachycardia was the most frequent complication, followed by paralytic ileus and urinary retention.

Table 1 describes the baseline characteristics of the participants. Most were aged 18–30 years (239, 79.66%), while 8 (2.66%) were younger than 18 years and 53 (17.66%) were older than 30 years. Primigravida women constituted 140 (46.67%) of the study population, 87 (29.00%) had fewer than four pregnancies and 73 (24.33%) were grand multipara. Mild anaemia was present in 252 women (84.00%), moderate anaemia in 45 (15.00%) and severe anaemia in 3 (1.00%).

Table 1: Baseline characteristics of the study participants (n=300)

Characteristic	Category	Frequency (n)	Percentage (%)
Age	<18 years	8	2.66
	18–30 years	239	79.66
	>30 years	53	17.66
Parity	Primigravida	140	46.67
	<4 pregnancies	87	29.00
	≥4 pregnancies	73	24.33
Anaemia	Mild (+)	252	84.00
	Moderate (++)	45	15.00
	Severe (+++)	3	1.00

Table 2 presents the distribution of maternal risk factors in relation to non-haemorrhagic puerperal complications. Grand multiparity was the most common risk factor (73, 24.33%), followed by prolonged labour (45, 15.00%), pre-eclampsia/eclampsia (37, 12.33%), prolonged rupture of membranes (20, 6.67%) and antepartum haemorrhage (15, 5.00%). Age below 18

years (8, 2.66%), obstructed labour (5, 1.67%) and severe anaemia (3, 1.00%) accounted for smaller proportions. Complications numbered 8 with prolonged rupture of membranes, 6 with obstructed labour, 4 with prolonged labour, 3 with antepartum haemorrhage and 1 with severe anaemia and none with age below 18 years, grand multiparity or pre-eclampsia/eclampsia.

Table 2: Distribution of maternal risk factors in relation to non-haemorrhagic puerperal complications (n=300)

Risk factor	Total patients, n (%)	Non-haemorrhagic complications, n
Age <18 years	8 (2.66)	0
Grand multiparity	73 (24.33)	0
Severe anaemia	3 (1.00)	1
Prolonged labour	45 (15.00)	4
Prolonged ruptured membrane	20 (6.67)	8
Pre-eclampsia/eclampsia	37 (12.33)	0
Antepartum haemorrhage	15 (5.00)	3
Obstructed labour	5 (1.67)	6

Table 3 shows the mode of delivery according to maternal risk status. In the non-risk group, 84 women (56.00%) had normal vaginal delivery without episiotomy, 47 (31.33%) had normal vaginal delivery with episiotomy, 12 (8.00%) underwent ventouse extraction and 7 (4.60%) had lower uterine caesarean section. In the risk group, 31 women (20.66%) had

normal vaginal delivery without episiotomy, 25 (16.66%) had normal vaginal delivery with episiotomy, 4 (2.66%) required ventouse extraction and 87 (58.00%) underwent lower uterine caesarean section. One woman in the risk group required subtotal hysterectomy following uterine rupture and 2 required caesarean hysterectomy.

Table 3: Mode of delivery according to maternal risk status

Mode of delivery	Non-risk group, n (%)	Risk group, n (%)
Normal vaginal delivery without episiotomy	84 (56.00)	31 (20.66)
Normal vaginal delivery with episiotomy	47 (31.33)	25 (16.66)
Ventouse extraction	12 (8.00)	4 (2.66)
Lower uterine caesarean section	7 (4.60)	87 (58.00)
Subtotal hysterectomy following ruptured uterus	0	1 (0.66)
Caesarean hysterectomy	0	2 (1.33)

Table 4 lists the types of non-haemorrhagic immediate puerperal complications according to maternal risk factors. A total of 23 complications were reported: 22 among women with identified risk factors and 1 in the non-risk group. Tachycardia was the most frequent (16 events) and occurred with severe anaemia,

prolonged labour, prolonged rupture of membranes (8), antepartum haemorrhage (3) and obstructed labour (3). Paralytic ileus (4 events) occurred with prolonged labour (1) and obstructed labour (3). Urinary retention (3 events) was reported in one non-risk woman and in two women with prolonged labour.

Table 4: Types of non-haemorrhagic immediate puerperal complications according to maternal risk factors

Risk factor	Tachycardia, n	Paralytic ileus, n	Urinary retention, n	Total, n
Non-risk group	0	0	1	1
Age <18 years	0	0	0	0
Grand multiparity	0	0	0	0
Severe anaemia	1	0	0	1
Prolonged labour	1	1	2	4
Prolonged ruptured membrane	8	0	0	8
Pre-eclampsia/eclampsia	0	0	0	0
Antepartum haemorrhage	3	0	0	3
Obstructed labour	3	3	0	6
Total reported complications	16	4	3	23

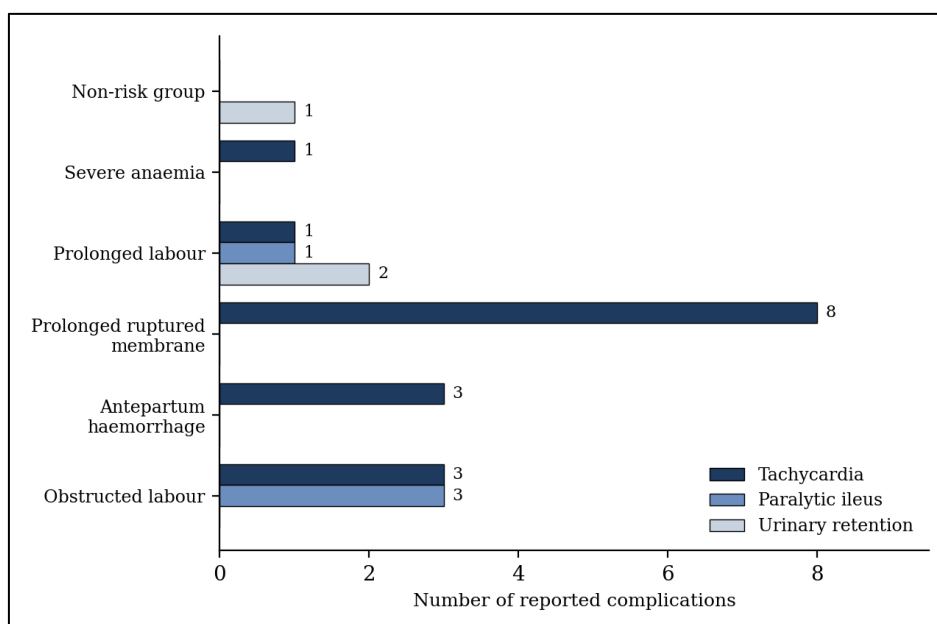
**Figure 1: Distribution of non-haemorrhagic immediate puerperal complications according to maternal risk factors. Categories with no reported complications**

Table 5 compares non-haemorrhagic puerperal complications by overall risk status. Twenty-two women (7.33%) in the risk group experienced such complications, compared with 1 woman (0.33%) in the non-risk group, giving 23 (7.66%) in total. Among the

risk-associated complications, prolonged rupture of membranes accounted for 8 reported events, obstructed labour for 6, prolonged labour for 4, antepartum haemorrhage for 3 and severe anaemia for 1.

Table 5: Comparison of non-haemorrhagic puerperal complications according to overall maternal risk status

Risk status	Women with non-haemorrhagic complications, n (%)
Non-risk group	1 (0.33)
Risk group	22 (7.33)
Total	23 (7.66)

DISCUSSION

This study described non-haemorrhagic immediate puerperal complications among 300 women admitted for confinement at a tertiary referral hospital and examined how they were distributed across maternal risk factors. In total, 23 complications (7.66%) were recorded, 22 (7.33%) in women with identified risk factors and only 1 (0.33%) in a woman without any. This concentration in the risk group fits the expectation that most early puerperal morbidity arises on a background of recognisable obstetric or medical problems, although

the small number of events calls for careful interpretation. The single event in the non-risk group was urinary retention, which was probably unrelated to underlying maternal pathology.

The demographic profile resembles earlier Bangladeshi hospital data. Rawshan [18] reported that about 80% of women were aged 18–30 years and 79.66% of the present participants fell in this band. Primigravidae and grand multiparae made up 46.67% and 24.33% of the sample, compared with 31% and 20.5% in that report

[18], a difference that may reflect the referral pattern of the hospital.

Tachycardia was the commonest complication (16 events) and prolonged rupture of membranes accounted for half of them. Prolonged rupture of membranes is a recognised route to intrauterine and puerperal infection and Middleton *et al.*, [13] found that planned early birth reduced maternal infection compared with expectant management in term prelabour rupture of membranes. A raised pulse in these women may therefore signal evolving infection, although dehydration, exhaustion and pain can also contribute. In this unit, per vaginal examinations were restricted and broad-spectrum antibiotics were given, which is in keeping with the prophylactic approach to puerperal fever discussed by Adriaanse *et al.*, [14]. Tachycardia also accompanied antepartum haemorrhage, obstructed labour, severe anaemia and prolonged labour, conditions in which blood loss, anaemia or prolonged physical stress could plausibly raise the heart rate.

Paralytic ileus occurred in four women, three in the obstructed labour category and one with prolonged labour. Although 45 women had prolonged labour and five had obstructed labour, the overall frequency was only 1.3% of the sample, a result attributed to nasogastric suction, withholding of oral food, intravenous fluids, an H2 blocker and antibiotics. The absence of ileus in all other risk categories suggests that prolonged mechanical stress on the pelvis and bowel, rather than risk status in general, was the relevant factor, although this cannot be tested with the present data.

Urinary retention was recorded in three women, one without risk factors and two with prolonged labour. In the non-risk woman, the likely explanation was reflex inhibition from perineal pain, an unfavourable environment and lack of encouragement, whereas bladder oedema, congestion and atonicity were the probable causes after prolonged labour. Mulder *et al.*, [15] identified epidural analgesia, instrumental delivery, episiotomy and primiparity as risk factors for overt retention and Yip *et al.*, [16] related obstetric factors to post-void residual volume and regarded covert retention as self-limiting. Olofsson *et al.*, [17] showed that epidural analgesia increases the risk, but analgesic practice was not analysed here, so its contribution cannot be judged.

Mode of delivery differed sharply by risk status. Lower uterine caesarean section was performed in 58.00% of the risk group but only 4.60% of the non-risk group, while ventouse extraction and episiotomy-assisted vaginal delivery were also recorded and all three hysterectomies occurred in the risk group. Operative and instrumental delivery and episiotomy are themselves linked to perineal and urinary morbidity [15]. One complete perineal tear followed ventouse extraction with a near-midline episiotomy in an eclamptic woman with a

3.9 kg baby and Zetterström *et al.*, [19] associated sphincter tears with postmaturity, fundal pressure, midline episiotomy and fetal weight. No complication was reported in women younger than 18 years, grand multiparae or women with pre-eclampsia or eclampsia, which may reflect close monitoring and early management of these recognised high-risk groups. Overall, the findings support careful observation in the first 24 hours, particularly after prolonged rupture of membranes, obstructed labour and prolonged labour.

Clinically, the data suggest that observation after delivery should be tailored to the underlying risk. Heart rate and temperature merit regular recording after prolonged rupture of membranes, abdominal distension and bowel sounds should be monitored after obstructed or prolonged labour and bladder emptying should be checked early after prolonged labour, especially when perineal pain or instrumental delivery is present. Because complications were reported by risk factor and the categories overlap, the counts cannot be converted into rates for each risk factor and the six events attributed to obstructed labour among five women show that one woman could contribute more than one complication. The results should therefore be read as a descriptive map rather than as measures of association.

Limitations of the study

The study was conducted in a single tertiary referral hospital that admits mainly referred and complicated cases, which limits generalisation to the wider population. Diagnosis was largely clinical because investigation facilities were limited, so some complications may have been missed or misclassified. Many women had no antenatal check-up, so some risk factors may have been missed and overlapping risk categories meant complications could not be assigned to individual women. The numbers of events were small and only descriptive analysis was possible.

CONCLUSION

Non-haemorrhagic immediate puerperal complications, chiefly tachycardia, paralytic ileus and urinary retention, were concentrated among women with identified obstetric risk factors, with prolonged rupture of membranes, obstructed labour and prolonged labour contributing most events. Women with these conditions need systematic observation during the first 24 hours after delivery, supported by infection prophylaxis, bowel and bladder surveillance and skilled supervision of labour. Larger studies with analytical methods are needed to confirm these associations and the findings should guide targeted postnatal monitoring in busy referral hospitals.

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